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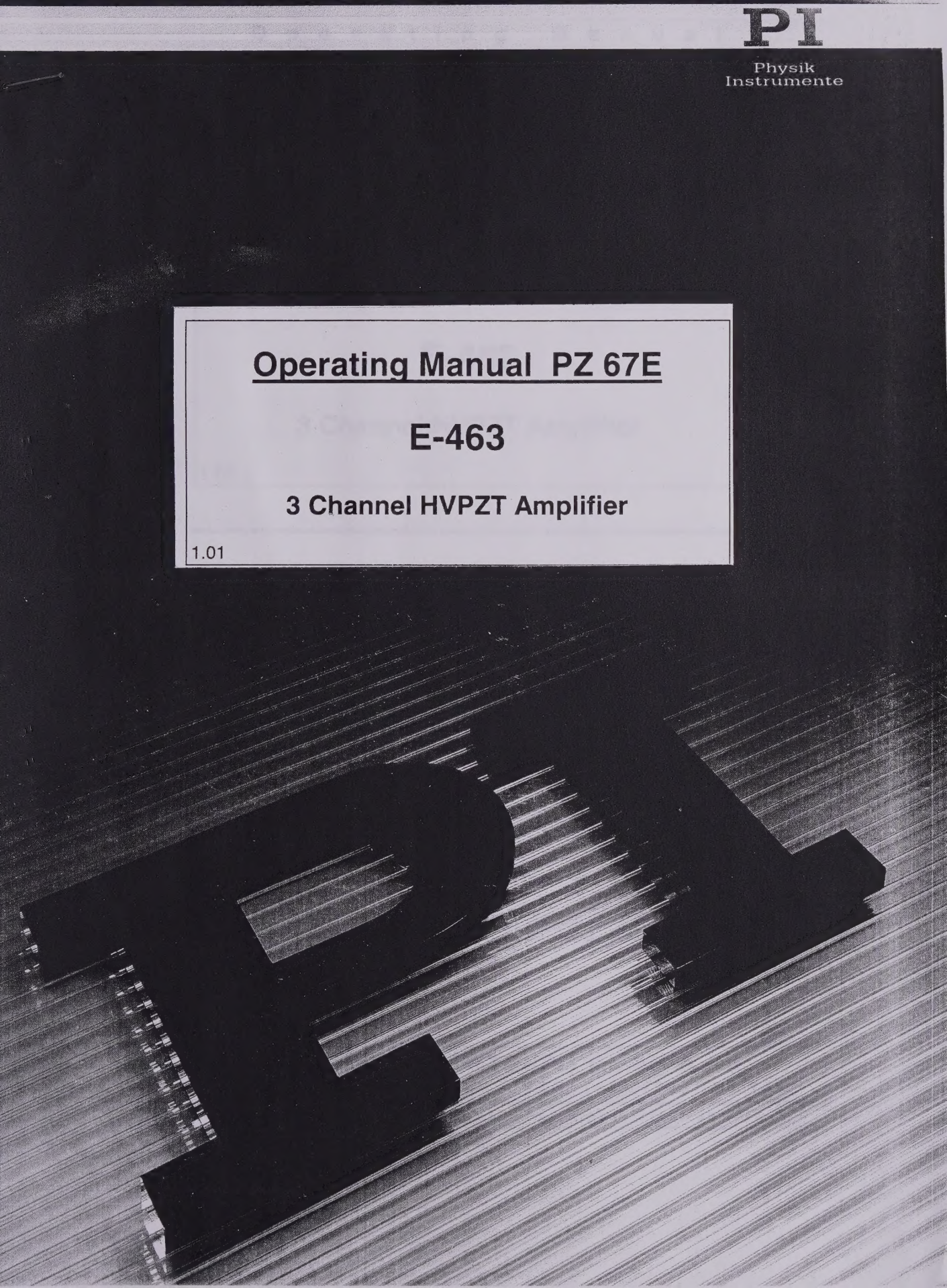
Operating Manual PZ 67E

E-463

3 Channel HVPZT Amplifier

1.01



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Operating Manual
and
Technical Documentation

This Document is valid for thie Product :

E-463.00 3 Channel HVPZT Amplifier

Release: 1.01
Release Date: 10 December 1999

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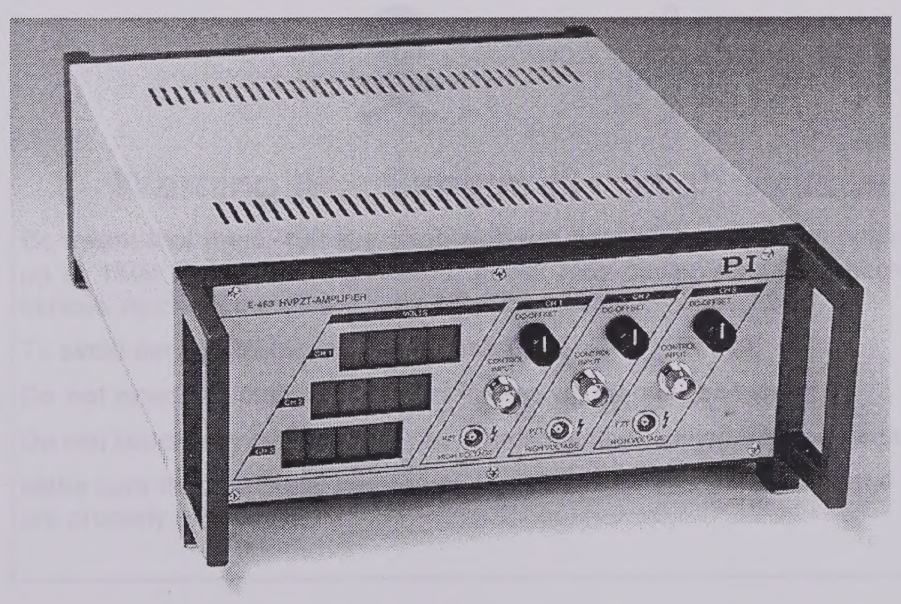

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1. General

E-463.00 HVPZT Amplifiers are bench top amplifiers for **High Voltage Piezoelectric Translators** (HVPZTs). The device contains three independant amplifiers capable to output and to sink a peak current of 4 mA and an average current of 3 mA each.

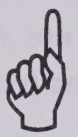
The output range covers 0 to 1500 Volts with negative polarity to complys with the requirements of HVPZTs.

The output voltage can be set either manually via a 10-turn potentiometer or by analog control signals. Three 3½ digit LED display the output voltge of each individual channel.

Features :

- Manual potentiometer PZT displacement control
- Analog signal displacement control
- On-line output LED display for all channels
- Compatible with all PI HVPZTs

2. Warning Notice



Warning !!! Danger !!! High Voltage !!!

Be aware that the E-463 is a **High Voltage Amplifier** capable to output voltages up to **1500 Volts**. The high output power may cause electrical shocks or even serious injuries if the device is handled improperly.

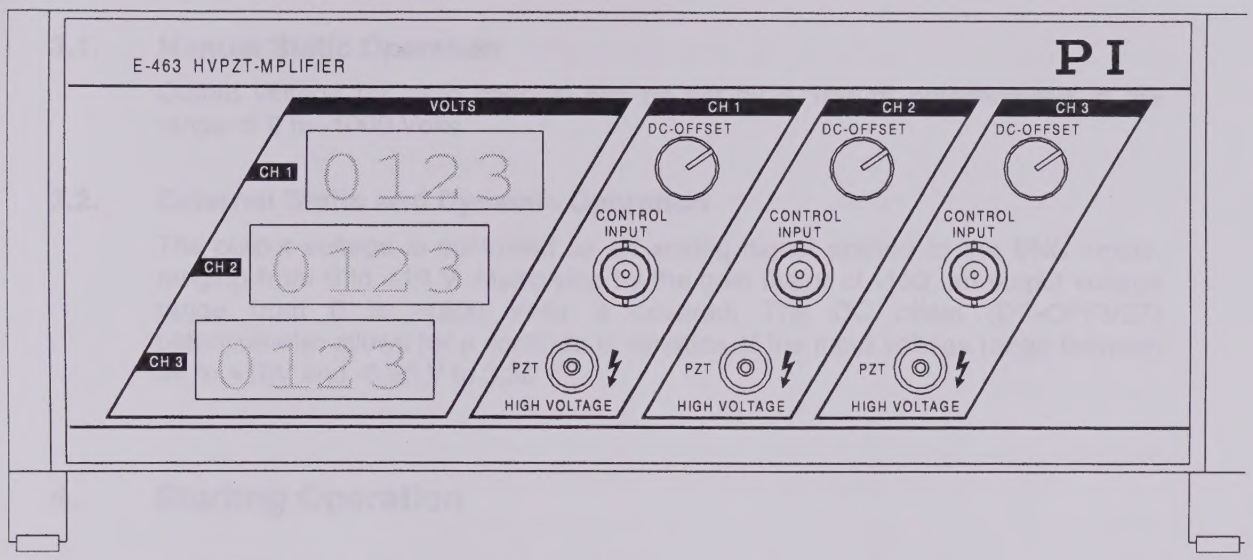
To avoid danger, follow the instructions below :

Do not open the chassis while the line power cord is connected!

Do not touch any part that may be connected to the High Voltage output!

Make sure that the metal casings of all PZT elements connected to the HV output are properly grounded.

2.1. Front Panel Layout



Dwg# E-46300.wmf, **E-463 Front Panel Layout**

2.2. Front Panel Operating Elements:

- 3 DC-Offset Potentiometers, 10-turn, one for each channel
- 3 Control voltage Input sockets (BNC, 0..+10V), one for each channel
- 3 High Voltage output sockets (LEMO, 0..-1500V) one for each channel
- 3 3½ digits LED Display for output voltages

2.3. Back Panel Operating Elements:

Power switch with line fuse assembly

3. Modes of Operation

E-463 can be operated in 2 ways:

3.1. Manual Static Operation

Output voltage for each channel can be set by a 10-turn potentiometer in the range of 0 to -1000 Volts.

3.2. External Static and Dynamic Operation

The output voltage is controlled by an analog signal applied to the BNC inputs, ranging from 0 to +10 V. Multiplying by the gain factor of -150, an output voltage range from 0 to -1500 Volts is covered. The DC offset (DC-OFFSET) potentiometer allows for a continuous variation of the input voltage range between 0V to +10V and -6.66 V to 3.33 V.

4. Starting Operation

4.1. Manual operation

The front panel offset (DC-OFFSET) potentiometers allow operation of HVPZTs within their nominal expansion ranges from 0 to -1000 Volts.

The E-463 outputs a constant DC voltage to the PZT, depending on the Offset setting. The actual expansion of the PZT depends on the specific expansion capability (µm/V).

Prior to power-up the device, follow these steps :

- Read the WARNING note on page 2.
- While the device is **not** powered, connect the PZTs to the **HV OUT** connectors (LEMO).
- Turn the **DC-Offset** potentiometers to zero (CCW).
- Switch the device ON. The green switch lights up.
- Turn the display channel select switch to position **1, 2 or 3**.
- Turn the corresponding **DC-offset** potentiometer CW. The voltage changes as indicated on the display.
- Each channel can be set individually, independent of the displayed channel.
- Before turning the E-463 off, set all channels to zero output (turn the DC-Offset potentiometers to CCW stop).

4.2. External Static/Dynamic Operation

In this mode the output voltage is controlled by an analog input signal within the range of 0 to +10 V, applied to the **CONTROL INPUT** BNC connectors. Output voltages up to -1500 V can be generated (gain factor -150)! Check the maximum operating voltage of each connected PZT and do not exceed this voltage.

Make sure to not exceed the allowed PZT operating voltage range when operating the E-463 with external signals!

The DC OFFSET potentiometers produce an offset voltage of 0 to 6.6 V to the control input signal.

Example 1: A low frequency (< 1 Hz) sinusoidal signal with an amplitude of 0 to +5 V is applied to the **CONTROL INPUT** socket. The resulting output is a sinusoidal signal with an amplitude of 0 to -750 V.

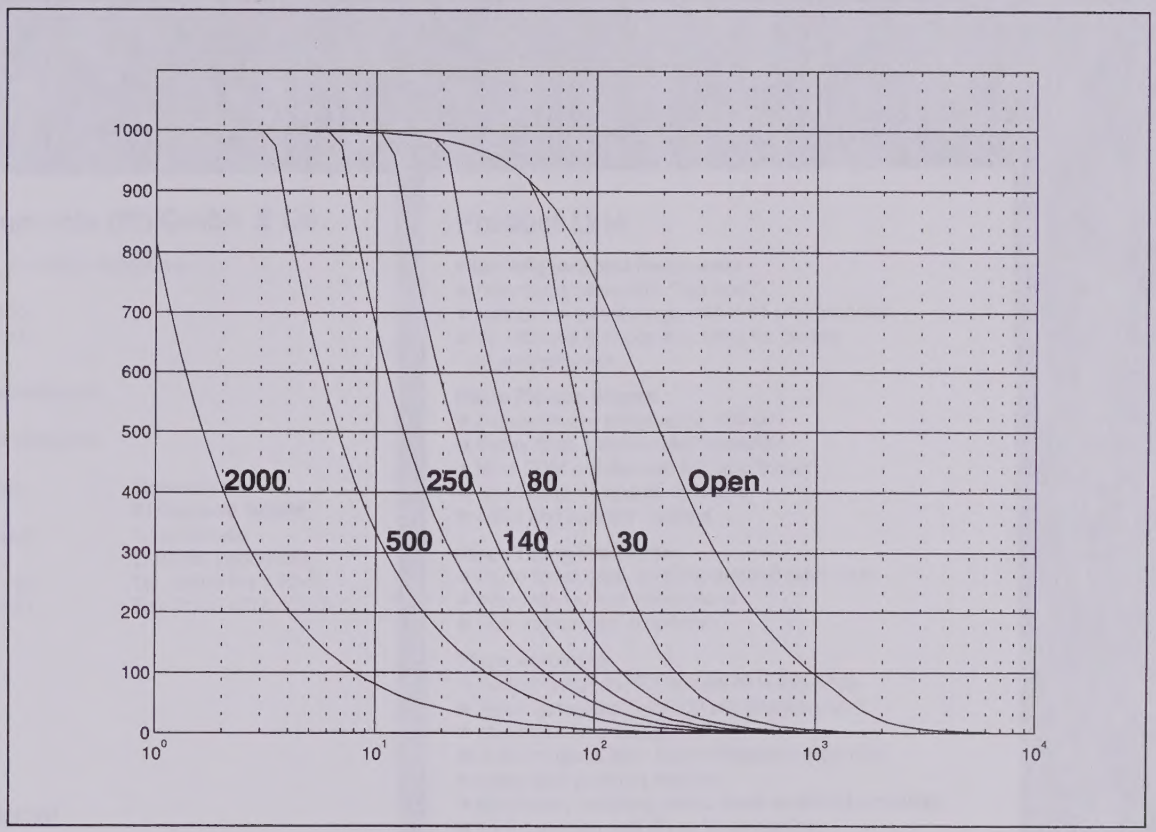
Example 2: A function generator with a -2.5 to +2.5 V (peak-peak: 5V) sinusoidal signal is connected to the **CONTROL INPUT** socket. The resulting output will be clipped for negative inputs, because the E-463 can not output positive voltages (negative gain!). The actual output is the negative half of the sine wave with peak value of -375 V (2.5 V multiplied by a gain factor of -150).

In order to get the full sine wave, the input can be offset with the **DC-OFFSET** potentiometer by 2.5 V. The resulting output is a sinusoidal signal with an amplitude of 0 to -750 V (peak-peak) like in example #1.

5. E-463 Specifications:

Function:	DC Amplifier
Application:	Driving up to 3 HVPZTs manually or by an external analog signals.
Channels:	3
Output Voltage Range:	0 to -1500 V
Output Polarity:	negative
Peak Current:	4 mA (for < 5 ms)
Max. Output Current:	3 mA (for > 5 ms)
Peak power:	5 W (for < 5 ms)
Max. Average Power:	4 W (for > 5 ms)
Control Voltage Input:	0 to +10 V
Voltage Gain:	-150 ±1
Input Impedance:	1 MOhm
Display:	3½ Digits LED
Control input sockets:	3 BNC
PZT output sockets:	3 LEMO ERA.0S.250.CTL
Line Voltage:	90 to 240 VAC (wide range P/S)
Fuse:	0.5 A (medium)
Dimensions:	288 x 235 x 103 mm (HxWxD)
Weight:	4.4 Kg

6. E-463 Frequency Response



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Curve Parameters: Load capacitances in nF

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Piezo Tilting Platforms
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- Tilt range up to 5 milliradians.
- Sub-millisecond response.

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